



# Connecting WAAS Enhanced Network Modules to the Network

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This guide describes how to connect Cisco Wide Area Application Services (WAAS) enhanced network modules to your network. It contains the following sections:

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## WAAS Enhanced Network Modules

The WAAS enhanced network module (NME-WAE family of devices) works together with other wide-area application engines (WAEs) in your network to optimize TCP traffic over your network.

When client and server applications attempt to communicate with each other, the network intercepts and redirects this traffic to the WAEs so that they can act on behalf of the client application and the destination server. The WAEs examine the traffic and use built-in application policies to determine whether to optimize the traffic or allow it to pass through your network unoptimized. Three models of the WAAS enhanced network module are available. (See [Figure 1 on page 2.](#))

- NME-WAE-302-K9
- NME-WAE-502-K9
- NME-WAE-522-K9

All models ship from the factory with the following hardware preinstalled. (See [Table 1.](#))



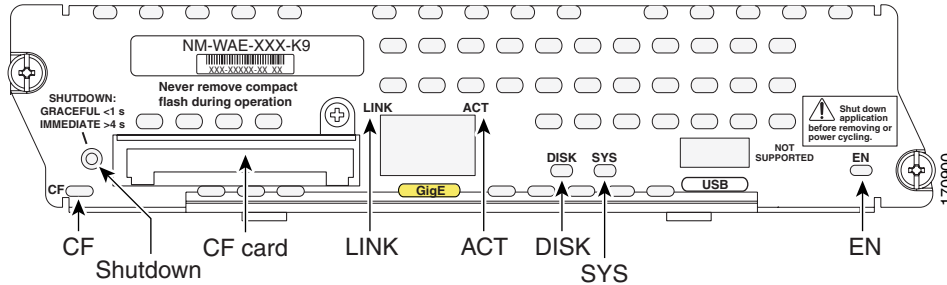
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**Table 1** Preinstalled Hardware in WAAS Enhanced Network Modules

Model	Hard Disk	Memory	Daughter Card	CompactFlash
NME-WAE-302-K9	80 GB (SATA)	512 MB	Included	64 MB
NME-WAE-502-K9	120 GB (SATA)	1 GB	Included	64 MB
NME-WAE-522-K9	160 GB (SATA)	2 GB	Included	64 MB

**Figure 1** NME-WAE Faceplate



<b>CF</b>	Status of the CompactFlash Off—CompactFlash is not used Flashing—Application detected CompactFlash at boot up
<b>SHUTDOWN</b>	Press the SHUTDOWN button for less than 2 seconds to gracefully shut down the module. Press the SHUTDOWN button for more than 4 seconds to cause an immediate module shutdown, which may impact file operations that are in progress.
<b>LINK</b>	Status of Gigabit Ethernet link On—Link is enabled Off—Link is disabled
<b>ACT</b>	Status of Gigabit Ethernet activity On—Active Off—Inactive
<b>DISK</b>	Status of hard drive activity On—Active Off—Inactive
<b>SYS</b>	Status of system shutdown <b>Note</b> Do not remove power without first shutting down the application. On—System is shut down and ready for host power down Off—Application is stable. Flashing—System shutdown is in progress
<b>EN</b>	Status of the network module On—Detected by the host Cisco IOS software and enabled Off—Disabled

## Shutting Down WAAS Enhanced Network Modules

Press the reset button on the network module faceplate for less than 2 seconds to perform a graceful shutdown of the network module before removing power from the router or before starting an online insertion and removal (OIR) sequence on the router. The application may take up to 2 minutes to fully shut down.

**Caution**

If you press the shutdown button for *more than 4 seconds*, a nongraceful shutdown of the hard disk will occur and may cause file corruption on the network module's hard disk. After a nongraceful shutdown, the HD and SYS LEDs remain lit. Press the shutdown button for *less than 2 seconds* to gracefully reboot the network module.

## Connecting WAAS Enhanced Network Modules

**Caution**

To comply with the Telcordia GR-1089 NEBS standard for electromagnetic compatibility and safety, connect the WAAS enhanced network modules (NME-WAE-302-K9, NME-WAE-502-K9 and NME-WAE-522-K9) only to intra-building or unexposed wiring or cable. The intrabuilding cable must be shielded and the shield must be grounded at both ends. The intra-building port(s) of the equipment or subassembly must not be metalically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metalically to OSP wiring.

To connect WAAS enhanced network modules to an external device, use a straight-through two-pair Category 5e unshielded twisted-pair (UTP) cable, and connect the RJ-45 Gigabit Ethernet port on the network module to a switch, hub, repeater, server, or other Gigabit Ethernet network device.

**Note**

RJ-45 cables are not available from Cisco Systems, Inc. These cables are widely available and must be Category 5e cables.

## Establishing a Gigabit Ethernet Internal Connection

Use the Cisco High-Speed Intrachassis Module Interconnect (HIMI) feature to establish a Gigabit Ethernet internal logical connection between two network modules, or between an onboard small-form-factor pluggable (SFP) Gigabit Ethernet module and a network module on Cisco 3825 and Cisco 3845 routers.

Connections can be only established as follows:

- Between the Gigabit Ethernet port in an installed onboard SFP module on the Cisco 3825 and Cisco 3845 routers and a network module Gigabit Ethernet interface installed in network module slots 1 and 2 on a Cisco 3825 router or Cisco 3845 router
- Between Gigabit Ethernet interfaces in network module slots 1 and 2 on the Cisco 3825 router
- Between Gigabit Ethernet interfaces in network module slots 2 and 4 on the Cisco 3845 router

**Note**

A module interconnection between the Gigabit Ethernet port on an SFP module and a network module slot or a network module-to-network module cross-connection is permitted at any given time, but both types of connections cannot exist at the same time.

**Note**

Connections between the onboard Ethernet ports and network module slots are not supported.

For details about configuring HIMI connections, see the *Cisco High-Speed Intrachassis Module Interconnect (HIMI) Configuration Guide* on Cisco.com:

[http://www.cisco.com/en/US/products/ps5855/prod\\_configuration\\_guide09186a008068ea83.html](http://www.cisco.com/en/US/products/ps5855/prod_configuration_guide09186a008068ea83.html)

## Online Insertion and Removal of Cisco Network Modules Procedure

Some Cisco routers allow you to replace network modules without switching off the router or affecting the operation of other interfaces. This feature is called online insertion and removal (OIR). OIR of a module provides uninterrupted operation to network users, maintains routing information, and ensures session preservation.

**Caution**

Unlike other network modules, WAAS enhanced network modules use hard disks. Online removal of disks without proper shutdown can result in file system corruption and might render the disk unusable. The operating system on the network module must be shut down in an orderly way before removing or powering down the module.

**Caution**

Cisco routers support OIR with similar modules only. If you remove a module, install another module exactly like it in its place. If you remove a 2-slot module (along with any installed WAN or voice interface cards), install another module and card combination exactly like it.

For a description of informational and error messages that may appear on the console during this procedure, see the hardware installation guide for your router.

To perform online removal of a network module and insertion of a replacement, follow these steps, with the router in privileged EXEC mode:

**Step 1** Initiate a network module session using the following command:

```
Router# service-module integrated-service-engine slot/unit session
```

```
Trying 10.10.10.1, 2065 ... Open
```

```
Press RETURN to get started!
```

```
Router> enable
```

```
Router#
```

**Step 2** Save the running configuration of the network module using the following command from the **Router # prompt**:

```
Router# copy running-config tftp tftp-server-address filename
```

**Step 3** Exit the network module session by pressing **Control-Shift-6**, followed by **x**.

**Step 4** On the router, clear the integrated-service-engine console session using the following command:

```
Router# service-module integrated-service-engine slot/unit session clear
```

**Step 5** Perform a graceful shutdown of the network module disk drive by using the following command:

```
Router# service-module integrated-service-engine slot/unit shutdown
```

**Step 6** Shut down the network module interface:

```
Router (config)# interface integrated-service-engine slot/unit
Router (config-if)# shutdown
Router (config-if)# exit
```

**Step 7** Unplug all network interface cables from the network module.

**Step 8** Loosen the two captive screws holding the network module in the chassis slot.

**Step 9** Slide the network module out of the slot.

**Step 10** Align the replacement network module with the guides in the chassis slot, and slide it gently into the slot.



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**Note** If the router is not fully configured with network modules, make sure that blank panels fill the unoccupied chassis slots to provide proper airflow.

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**Step 11** Push the module into place until you feel its edge connector mate securely with the connector on the backplane.

**Step 12** Reconnect the network interface cables previously removed in [Step 7](#).

**Step 13** Check that the network module LEDs are on and that the power (PWR) and enable (EN) LEDs on the front panel are also on. This inspection ensures that connections are secure and that the new unit is operational.

**Step 14** Initiate a network module session with the following command:

```
Router# service-module integrated-service-engine slot/unit session
```

```
Trying 10.10.10.1, 2129 ... Open
```

```
ISE-network module now available
```

```
Press RETURN to get started!
```

```
Router> enable
```

```
Router#
```

**Step 15** Restore the network module running configuration by using the following command from the service module prompt:

```
Router# copy tftp running-config tftp-server-address filename
```

**Step 16** Exit the network module session by pressing **Control-Shift-6**, followed by **x**.

**Step 17** On the router, clear the network module session by using the following command:

```
Router# service-module integrated-service-engine slot/unit session clear
```

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## Related Documents

For additional information, see the following documents and resources.

Related Topic	Document Title
WAAS software installation and administration, configuration, and operation	<i>Configuring Cisco WAAS Enhanced Network Modules for Cisco Access Routers</i> <a href="http://www.cisco.com/en/US/docs/app_ntwk_services/waas/waas/v403/module/configuration/guide/wsnmecfg.html">http://www.cisco.com/en/US/docs/app_ntwk_services/waas/waas/v403/module/configuration/guide/wsnmecfg.html</a>
Cisco WAAS software website and reference documentation	<i>Cisco Wide Area Application Services (WAAS) Software</i> <a href="http://www.cisco.com/en/US/products/ps6870/tsd_products_support_series_home.html">http://www.cisco.com/en/US/products/ps6870/tsd_products_support_series_home.html</a>
Regulatory compliance and safety information	<i>Cisco Network Modules and Interface Cards Regulatory Compliance and Safety Information</i> <a href="http://www.cisco.com/en/US/docs/routers/access/interfaces/rcsi/IOHrcsi.html">http://www.cisco.com/en/US/docs/routers/access/interfaces/rcsi/IOHrcsi.html</a>
Cisco IOS software website and reference documentation	<i>Cisco IOS Software</i> <a href="http://www.cisco.com/web/psa/products/index.html?c=268438303">http://www.cisco.com/web/psa/products/index.html?c=268438303</a>

## Obtaining Documentation, Obtaining Support, and Security Guidelines

For information on obtaining documentation, obtaining support, providing documentation feedback, security guidelines, and also recommended aliases and general Cisco documents, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

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